Status of Information Technology and Health Information Systems

Ministry of Health, Iraq

Training Model Primary Providers (TMPP)
RTI 08954.004
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Executive Summary

Information Technology (IT) and Health Information Systems (HIS) within the Ministry of Health (MOH) are in early stages of development. With the exception of two small networks, the Ministry, all computers are stand-alone desktop computers. There are no centralized databases. The Ministry has established standard HIS forms, tables, and reports, as well as standard processing and reporting responsibilities and relationships. But the use of information technology is very limited. Data is entered and processed using Microsoft Word, Excel, and to a very limited extent, Access. The Ministry has established few standard coding systems, has no minimum standard datasets, and no data dictionary. The Ministry is aware of problems with data quality, completeness, and timeliness from governorate health directorates. The Ministry is also aware of weaknesses in its current supervisory checklist system for monitoring the quality of services in health care facilities.

Despite this very early stage of development there are surprising and very positive indications of strong capacity to develop and operate an effective HIS. The Ministry has strong capacity in survey design and data analysis. There is strong evidence that demand for quality data in decision making is driving HIS strategy. The Ministry has a very clear set of medium-term objectives for improving the effectiveness of the existing HIS. Activities over the past two years and on-going are clearly aimed at achieving these objectives. Key departments within the central Ministry are cooperating to achieve these objectives. Activities are extending to all levels of the system. Finally, major activities have the formal support of the Minister and the budget of the Ministry.

The World Health Organization (WHO) has been providing valuable support in the form of computers, networking, and telecommunications, and may be developing database applications to automate HIS data processing and reporting.

Additional technical assistance is needed in several areas, including the following: IT strategy, management, and operations; networking and telecommunications; information systems security; software development; database design; website design and development; data transmission; end-user support systems; data quality assurance; and best practices in monitoring and evaluation systems.

[1] RTI International is a trade name of the Research Triangle Institute

Abbreviations

DOH ..... (Governorate) Directorate of Health
DSL ..... Digital Subscriber Line
HIS ..... Health Information System
HNS ..... Hughes Network Systems
HRDC ..... Human Resources Development Center
ICD ..... International Classification for Diseases
IEEE ..... Institute for Electronic and Electrical Engineers
IHSS ..... Iraq Health Systems Strengthening
IMCI ..... Integrated Management of Childhood Illness
IT ..... Information Technology
Kbps ..... Kilobits per second
LAN ..... Local Area Network
Mbs ..... Megabits per second
MOH ..... Ministry of Health
OEM ..... Original Equipment Manufacturer
PC ..... Personal Computer
PHC ..... Primary Health Care
RFP ..... Request for Proposals
SQL ..... Structured Query Language
TMPP ..... Training Model Primary Providers
USAID ..... United States Agency for International Development
USB ..... Universal Serial Bus
USD ..... United States Dollar
VSAT ..... Very Small Aperture Terminal
WHO ..... World Health Organization

Table of Contents

1 Introduction

Iraq's more than 27 million citizens are served by a public health system that includes 205 hospitals, 357 clinics, and 1,758 primary health centers. The current system concentrates primarily on tertiary curative health care. USAID is currently constructing nearly 150 new primary health care centers to serve as models in an effort to improve primary and preventive health care services throughout the country. A total of 21 of these centers have been designed to serve as training centers. Good information is needed to monitor the quality of health care services, to monitor the impact of training, and to provide managers and policy makers with the information they need to make informed decisions. Good information is accurate, complete, on time, in the right format, meets a real need, and is used.

Information technology, while not absolutely necessary, shift manual efforts from data processing and reporting, make it easier to convert raw data into useful information, reduce the time between the collection of data and reporting of results, and make those results easier to access.

The objectives of this report are to document, as accurately as possible, the current status of information technology and health information systems in the Iraq Ministry of Health (MOH). This report also describes the Ministry's current strategy and on-going activity in these two areas. Finally, this report recommends specific technical assistance activities in support of the TMPP objective and the objectives of the Ministry's current strategy.

Information collected for this report is from a serious of meetings and communications with Ministry department heads between 20 September and 20 October 2005. The names and titles are not included in this document for security reasons. Additional references are listed in Annex A.

2 Information Technology

2.1 Organization

Annex B contains current organizational diagrams of the Ministry. The current organization combines departments charge with direct management of health service delivery with departments responsible for administrative services on the technical side of the structure. This is an unusual combination of functions and the structure appears very unbalanced. This may reflect the relative strength of political and personal forces at the time this structure was developed.

The Information Center, commonly referred to in English by the Ministry as the "IT Department" is within the Divan (or Diwan) Constituency. The Divan constituency consists of the core departments often support the office of the Minister directly. In the current structure it appears to be clear to everyone in the Ministry that these departments are charged with supporting all ministry directorates, even thought they are within the Medical Directorate on the technical side of the structure.

Several other central directorates have information centers or computer departments. These include The General Company for the Marketing of the Medicines and Medical Requirements, and the Public Health and Primary Health Care Directorate.

The Information Technology (IT), Department within the Divan Constituency is responsible for repairing computers and computer peripherals from all other MOH divisions, including governorate and district health offices. The IT Department has energetic leadership and is clearly setting the pace in planning and activities to expand access to computing and develop health information system applications for all levels of the public health system. Recently the Ministe r signed a project to network all directorates of the central MOH, and to connect governorate and district offices, as well as many health facilities, to the Internet. This demonstrates the ability of the Head of the IT Department to gain support at the to p for large initiatives.

2.2 Human Capacity

The IT Department has a total staff of approximately 25 -30. Eight staff members are responsible for maintaining and repairing computers and peripherals. Twelve staff members are engaged in software development. This staff includes one network engineer.

Staff members have experience with stand -alone desktop PCs and related peripheral equipment. They have no experience managing a networked environment or network servers. The head of the department reports that the netwo rk engineer has strong technical capacity.

The 12-person programming staffs are actively engaged in developing stand -alone database applications for hospitals and other facilities using Microsoft Visual Fox Pro. A few of these programmers also have experi ence with Microsoft Access and Microsoft Visual Basic. Only one programmer has experience developing multi -user database applications. Many of the programmers have some experience developing web sites using tools such as Microsoft FrontPage, but no experie nce developing database-driven web applications. Members of the programming staff have experience using Structured Query Language (SQL) to develop database applications using Visual FoxPro. The head of the Department believes they need more training in the use of SQL.

There is clearly great interest and motivation among the staff to improve their technical knowledge and skills. For the most part they are learning on -the job with the tools and learning materials that are available to them. Very few of the co mputers in the department have Internet access. This and the limited availability of tools and technical books make it difficult for them to advance quickly.

2.3 Existing Infrastructure

Most computing resources within the central ministry are currently concent rated in the Human Resources Development Center (HRDC) and the Information Center (referred to as the IT Department in this report, since this term is used by the head of that department.) These consist of a variety of late model desktop computers running the Windows XP operating system and a variety of individual -use printers. Computer networks currently consist of a 20 -workstation training room and a small 13 -workstation network in the IT department. Each of these two networks is connected to the Internet via a small VSAT satellite dish.

Wireless networks abound in some areas of Baghdad. The Author detected 10 separate wireless access points from the 11 th floor of the main Ministry building. Only one of these access points was reasonably secure. Signal st rength suggested that one or two of these wireless access points may be in the Ministry building.

2.3.1 The IT Department

Annex C contains a completed assessment form for the IT Department. The Department has a wide variety of desktop PCs and individual printers provided by various donors. It has not be possible to get donors to provide equipment that conforms to more than a few basic standards (processor type and speed and minimum memory), and at this point the Department is happy to use what donors provide.

Other than a few computers connected to the department's Internet connection, none of the computers are networked. There are no shared network printers.

The Department Internet connection is via a Very Small Aperture Terminal (VSAT) satellite dish mounted on the roof of the building. Upstream bandwidth is reportedly 256Kbps shared. There are currently 13 desktop computers connected to this VSAT. None of the other computers in the Department have Internet access.

2.3.2 The Human Resources Development Center Computer Training Room

The Human Resources Development Center (HRDC) is the central training division of the MOH. The IT Department and the HRDC have worked together with the World Health Organization (WHO) to create a 20-seat computer-equipped training room in the main MOH administration building. The training room is equipped with new computers, desks, chairs, and a projector for training.

The WHO installed the VSAT Internet connection for the training room and is paying all of the costs for that connection. The WHO will continue paying these costs for the immediate future. No date has been set when the Ministry will assume the operating costs for this connection. The VSAT is Hughes Network System (HNS) DW4020. While this equipment is technically capable of downloa d speeds up to 2Mbs, it is likely limited to 128Kbps or 156Kbps for uploads with a contention ratio of 1:20 or higher. This means the available bandwidth may be shared by 20 or more subscribers. All computers in the training room are connected to this VSAT dish. The head of the HRDC and the head of the IT Department report that download speeds become very slow when more than 10 of the computers are using the Internet.

In collaboration with the IT Department, the HRDC is teaching entry-level classes in Microsoft Windows, Word, Excel, and Access for personnel in many directorates of the central Ministry. The training center has also provided training in AutoCAD for staff in the Projects and Engineering Services Directorate.

During our initial visit this train ing room as full and training activities were in progress. Students showed a high level of interest and enthusiasm for learning to use the technology.

2.3.3 Other Divisions of the Central Ministry

As mentioned in Section 3.1 several other directorates of the cen tral ministry have and use desktop computers. These include The General Company for the Marketing of the Medicines and Medical Requirements, and the Public Health and Primary Health Care Directorate. Many, if not most, offices within the central Ministry b uilding are equipped with at least one desktop computer. Many are also equipped with at least one printer and one small to medium size photocopier. The non-networked computers in the various directorates of the central Ministry are used for preparing docum ents in Microsoft Word and managing data in Microsoft Excel.

2.3.4 Governorate Offices and Health Care Facilities

There are 17 governorate health directorates. In addition there are three large district offices within Baghdad that serve many of the same functions for the three major district divisions of Baghdad. Most of these have one or more desktop computers and Internet connections through private Internet Service Providers (ISPs). Most of these connections are low-speed point-to-point wireless connections. In 2004 the Ministry distributed 40 computers and 40 printers to governorate health directorates. While these offices do not yet have their own IT units, the head of the IT department plans to create support units at this level, and has sent an official survey to these offices to determine precisely what computing capacity they have.

Computers in governorate DOH offices are used for general word processing and spreadsheet work. In addition they are used to enter aggregate HIS data for the governorate into a stand-alone Visual FoxPro database application. Data are then transferred to the Health and Vital Statistics Department of the Planning and Human Development Directorate on diskette. The Supervisory Unit in each governorate DOH also uses this capacity to enter the results of monthly primary health care center quality evaluations into Excel spreadsheets that are transmitted to the Public Health and Primary Health Care Department of the central Ministry for analysis and filing.

Each governorate is divided into districts, and each district has a district health office. The number of districts in each governorate ranges from 3 (Kerbala) to 11 (Sulaymaniyah). Most district health offices have no computing capacity.

There are 1,012 primary health care centers in central and southern Iraq[2]. According to the Head of the IT Department, none of these outside Baghdad is thought to be equipped with computers or Internet connections. Many primary health care centers within Baghdad have at least one computer and an Internet connection. The IT Department is responsible for these computers. These centers use computers to prepare documents and enter data in Word and Excel.

2.4 Existing Standards

The IT Department has set basic standards for desktop computers. Various donors have contributed various makes and models following their own internal guidelines, making it impossible for the Department to standardize on one or two models. This is also true for peripherals, such as laser printers. No other hardware standards have been set. The large stock of desktop computers, printers, and servers in storage awaiting the construction of a network in the central Ministry will establish de facto standards for the near future.

The de facto standard for the client operating system is Windows XP Professional. All current licenses for this software are Original Equipment Manufacturer (OEM) licenses included with new computers. The Ministry has also standardized on Symantec Norton Anti-virus and Microsoft Office 2003 Professional. Autodesk AutoCAD has become the standard Computer-Aided Design (CAD) software for architectural and engineering drawings. Unless licenses are provided by donors, the Ministry does not have licenses for the commercial software applications it uses. It is very difficult to purchase legally licensed software in Iraq.

No standards have yet been set in many other areas, including network and server security or server hardware and operating system. These standards are likely to emerge as the IT department expands networking to other divisions of the central Ministry and begins to build, guide, and support IT capacity at governorate, district,

[2] Source: Ministry of Health/Kimadia, Central Statistical Organization, Ministry of Industry & Minerals, World Health Organization and UNOHCI.

and facility levels. Annex D. contains a summary of the current status of IT standards within the Ministry.

2.5 Existing Systems

Information at all levels is currently kept on paper forms, Microsoft Word documents, and MS Excel spreadsheets. The Head of the IT Department stated that the most critical need was to develop databases to "improve the way they organize their work."

The WHO provided the Ministry with software for managing a pharmaceutical warehouse, but did not provide them with similar system for managing pharmaceutical supplies at the facility level. In PHC centers all supplies, medical and non-medical, are handled through the pharmacy. The IT Department has developed a Visual FoxPro application for managing pharmaceutical supplies for outpatients for hospitals. The IT Department is also engaged in a significant effort with physicians to identify requirements for information systems in primary health centers.

The IT Department has also developed a personnel database on its own without any executive mandate, and has been developing database systems for hospitals in Baghdad. The Department has not developed a standard set of database applications for hospitals, but approaches each different type of hospital as having a unique set of requirements.

2.6 Current Strategy

The current strategy of the IT Department is designed to achieve the following major objectives:

1. Establish a network infrastructure foundation to support the automated flow of information among divisions of the central Ministry, and between the central Ministry and remote offices and facilities.

2. Build information technology support capacity at the governorate and district levels to support the deployment of automated systems.

3. Strengthen the capacity of the IT department to develop database applications that meet the most critical needs in facilities for systems to improve pharmaceutical supply management and access to patient records.

2.7 Current Activities

The Department has initiated the following major activities:

1. Cooperation with the HRDC to create a training program in basic computing skills for staff in the central Ministry.

2. A project to network all divisions of the central Ministry.

3. A project to connect all remote health offices and facilities, with the exception of primary health care centers, to the Internet to enable them to submit data electronically to the Ministry.

4. Software development projects aimed at meeting the most critical needs for improved management systems as the facility level. These include pharmaceutical supply management and patient records.

5. An effort to redesign and host the Ministry's public website within the Ministry.

Training in basic computing skills is underway in the new HRDC computer training room and is attended with great interest.

The project to network all divisions of the central Ministry and to connect all remote health offices and many facilities to the Internet has been signed by the Minister. The Ministry will award a contract to a private company to complete the network installation in the central Ministry. The MOH has already released a Request for Proposals (RFP), received offers, and selected a contractor. Network installation is expected to begin in November and take place over the next four to six months.

The IT department has a storeroom filled with new desktop computers, printers, and servers provided by the WHO. This room contains 11 rack-mounted servers. When asked the purpose of the servers, the Head of the IT department responded that there was one for each of the 11 floors of the central Ministry building, and that other than providing e-mail to the staff of the Ministry, services to be provided by these services has not yet been determined.

With support from the WHO, the Ministry will award a separate contract focused on connecting hospitals, health offices, and primary health centers nation wide. The Ministry developed and issued a Request for Proposals (RFP) for this project. Offers have been received already from several vendors proposing technical solutions ranging from VSAT satellite dishes to IEEE 802.16, commonly known as WiMax. Total proposed costs are in the range of USD 3 million. The Head of the IT Department welcomes assistance in evaluating the technical and cost merits of the various proposals.

The WHO has a connectivity project with the MOH focused on connecting hospitals, health offices, and primary health centers nation wide. The MOH developed a Request for Proposals for this project and have received bids. They are evaluating them now. The total cost is in the range of USD 3 million. Bidders have proposed various technologies, including DSL landlines, VSAT satellite and IEE 802.16 (WiMax) point-to-point wireless. The Head of the IT Department would welcome TMPP technical assistance in reviewing these proposals. They are not certain about the advantages, disadvantages, and practicality of the proposed approaches.

The Ministry's public website was developed by and is hosted by the Baghdad Chamber of Commerce. This site is currently not functional. The Ministry finds it difficult to make updates to this site, since they must send updated material to the Chamber, and the Chamber has not been responsive in making these changes. The IT Department would like to redesign this site and host it within the MOH.

3 Health Information System

3.1 Organization

The USAID Iraq Health Systems Strengthening (IHSS) project worked with the Ministry to form a working group. The working group stopped meeting when the IHSS project ended. There currently does not appear to be any working group focused on developing HIS strategy, standards, and development priorities. The Health and Vital Statistics Department of the Planning and Human Development Director ate

The IT Department is currently leading efforts to computerize HIS component systems for facilities. The Head of the Department believes that the highest priority for the MOH should be to improve the management of critical systems. For example, the Head of the Department said that the MOH recently lost thousands of dollars in drugs when they expired due to poor management of pharmaceutical supplies. He stated that a system that could alert the MOH to impending expiration and reduce the wastage of

pharmaceuticals would have greater impact than the provision of new computer equipment.

The Health and Vital Statistics Department of the central Ministry is responsible for supervising the collection, processing, and reporting of HIS data throughout the public health care system. The Department is comprised of five specialized statistical divisions, each of which is comprised of several statistical units. The counterpart at the governorate level is the health and vital statistics division of the governorate health office. This division consists of three specialized statistical units and is connected to the department of health planning of the governorate. Below this, each type of facility, including PHC centers, includes a statistical unit. This unit is responsible for collecting, processing, and reporting data at the facility level, and reporting that data to the health and vital statistics division of the governorate.

3.2 Human Capacity

Discussions with department and directorate leaders, and documents provided by them in the course of this mission, demonstrate strong capacity to analyze and use information. In many ways documents provided by the Ministry and discussions with key stakeholders within the Ministry demonstrate a strong understanding of fundamental HIS principles and strong demand for good quality information. Products of the existing, largely manual, information system demonstrate the capacity to collect data and to transform it into information for decision makers. However, while the Ministry has systems in place to collect and report data from facility to district to governorate to the Ministry, there are weaknesses in design, execution, and the resources to collect, process, and report information more efficiently.

The Ministry is aware of problems with the completeness, quality, and timeliness of data collection and reporting. When made aware of weakness in the design of existing systems, Ministry leaders have grasped the problems quickly and started work to correct them. Thus, while existing systems are immature and use of information technology is very limited, there is strong evidence that the Ministry has the human capacity to make quick and effective use of good technical assistance.

3.3 Existing Standards

The Ministry has established coding standards for diseases and pharmaceutical supplies. The coding standard for diseases is the WHO International Classification for Diseases (ICD). The Ministry standard is currently ICD version 9 (ICD-9), but a program is underway to adopt the ICD-10 standard. During 2002 and 2003 the Ministry conducted nine 10-day computer-based workshops to disseminate knowledge of ICD-10 for future use in hospitals throughout the country. The Ministry has completed all parts of the Iraqi version of ICD-10 and expects to complete the conversion to this standard by the end of 2005.

The Ministry has also established a National Code for Pharmaceuticals. It is not clear whether this standard is related to the International Pharmacopoeia. No other coding standards appear to have been set by the Ministry, and the Ministry has no documented minimum data sets or data dictionary. The Health and Vital Statistics Department is aware of international data standards and the need to develop compatible Ministry standards. Activities are included in the Department's plan for 2005-2009 to strengthen Ministry data standards significantly.

The Ministry has not established and documented clear standards for the quality of health services provided through the various types of public facilities. However, the supervision checklist developed by the Ministry and in use for two years in effect sets some of the necessary standards. This checklist is now being reviewed and will be

extended to encompass Integrated Management of Childhood Illness (IMCI) and other practices being introduced through the TMPP.

3.4 Existing Systems

The existing HIS is managed by the Health and Vital Statistics Department of the central Ministry. The Department has developed standard forms, tables, and reports used throughout the system.

Personnel in the statistical unit and health personnel in charge of statistical activities in each facility extract information from daily reports and registers to complete the HIS forms. Certificates of vital events and in-patient forms are collected separately. Data consolidated on the standard forms, as well as the certificates of vital events and in-patient forms are submitted to the health and vital statistics department of the governorate DOH.

Data collected on paper forms at the facility level are checked for completeness and consistency by the governorate health and vital statistics unit. The data is then checked by the relevant technical departments within the governorate DOH before being entered into a Visual FoxPro database by the health and vital statistics unit. From there data are transferred to the Health and Vital Statistics Department of the central Ministry via diskette each month.

The Health and Vital Statistics Department in the central MOH receives data on diskette from governorate health directorates. This data includes vital events, in-patient records, incidence of communicable diseases, and other information. The Department checks the completeness and consistency of this data, and consolidates data from the various governorates during the second week of each month.

Certain communicable diseases, health programs, and specific activities are collected and processed daily or weekly, and other information may be collected semi-annually or annually. The Department checks, processes, and consolidates these data to produce national-level reports. These reports are combined with other HIS reports prepared using Excel spreadsheets and Word documents and are distributed to the various directorates and departments of the central Ministry. The original reports are stored in the Department as a vital resource.

Data processing occurs in various units at different levels of the system. In health care facilities, all processing occurs in the statistics unit, which may consist of only one or two persons. In governorate health directorates, data processing occurs in the health and vital statistics unit, as well as in other divisions of the health directorate. Within the central Ministry, HIS data processing occurs in the Health and Vital Statistics Unit, as well as in the Technical Affairs Directorate.

The Ministry has provided the WHO with samples of all standard HIS forms, tables, and reports. The WHO told the Ministry they would develop database systems for the Ministry based on this information. The Ministry does not know the current status of this project.

Some limited data analysis is done by the statistical unit in each health facility. More extensive analysis is done in each governorate health directorate. Many divisions within the central Ministry also analyze these results. In addition, various health program managers collect data for research and analysis using special surveys.

The Health and Vital Statistics Department understands the need for timely feedback at all levels, but considers this to be a weak point of the current system. Governorate health directorates offer some limited feedback to health facilities. The central Ministry is able to provide timely feedback to governorate health directorates.

The Department of Health and Vital Statistics produces several statistical publications. The Department has produced the Annual Health Statistics Report each year for the past two years (2003 and 2004.) The Department also produces a small pocket brochure of health statistics called the "Health Compass." This is a very nicely produced set of health system indicators. Unfortunately the current version for 2004 includes data from 2003, and infant and maternal mortality figures from a 1999 survey. Data from several governorates is missing. Considering the challenges faced in compiling data in 2003, the Health Compass is still a fine achievement. The Director of the Department is keenly aware of the poor quality of data received from governorate health offices and has asked for practical help in methods for improving data quality.

The Ministry considers in-service training and supervision for all workers at all levels to be important to improving the quality of information and health services. Training is provided through short courses in the central HRDC and in governorate health directorates. During 2002-2003 the Ministry conducted five training courses in data collection, processing, and analysis for the heads of statistical units in all governorates, and three national workshops to improve data collection, presentation, and local use of vital, health, and preventive statistics in all health directorates.

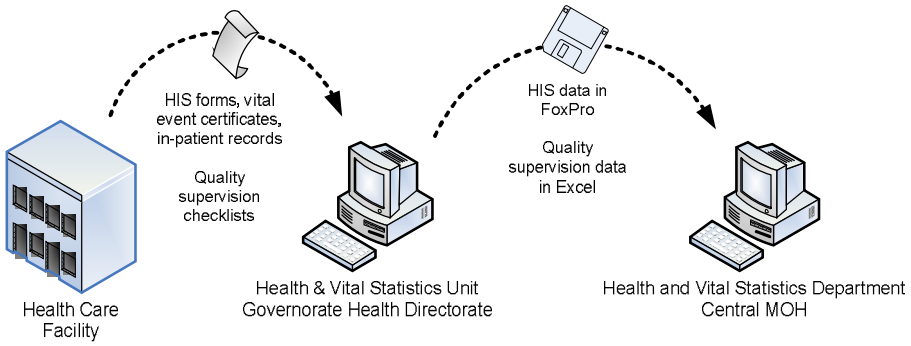
The Ministry has instituted a continuous supervision system at various levels, including for health care facilities. This system, which depends on site assessment visits, is described in detail below.

The PHC Centers Department of the Public Health and Primary Health Care Directorate developed a system for evaluating the performance of facilities, including primary health care centers. This system, which is designed to assess each facility once a month, has reportedly been in use for two years. This checklist has been reviewed and updated twice; the last revision was conducted eight months ago. The data collection instrument is a checklist that includes criteria grouped by function or section of the facility. The point value of each criterion in a section is 100 divided by the number of criterion in that section. If the criterion is observed in the facility, the facility receives the full point value. Otherwise the facility receives no points for that criterion. Thus all criteria within a section are weighted equally. Composite scores for each section are not weighted. Thus the system does not necessarily reflect the relative importance of each criterion to the quality of care, and comparison of composite scores between sections or departments can be very misleading. The wording of many criteria also leaves much up to the judgment of the data collector. Finally, each health facility is evaluated monthly. No significant changes may occur over such a short time, and frequent evaluation may lead to sloppy application by data collectors and complacency on the part of facility staff.

As described in Section 2.5, the IT department has begun to construct stand-alone database systems for use at the facility level. It is not clear whether these systems are being designed to provide data to the HIS.

Exhibit 1 shows the general flow of information from facility to the central Ministry. While output appears to be limited to monthly quality of care checklist scores and annual statistical publications this is not a complete picture. Results of the supervision checklist to monitor the quality of care are reportedly discussed with the director of the facility and are analyzed in the governorate DOH, as well as being reported and analyzed in the central Ministry. As stated above, HIS data is analyzed and reported to varying extent in facilities and in governorate DOH offices, as well as in various directorates of the central MOH. Demand for more and better quality information appears to be strong within the directorates of the central Ministry.

Exhibit 1 General Flow of Data from Facilities



3.5 Current Strategy

The Ministry does not have a broad based HIS working group developing a consensus on HIS strategy. HIS strategy is being lead by the Health and Vital Statistics Department, while IT strategy is being led by the IT Department. The major objectives of the current strategy are as follows:

1. Implementation of ICD-10
2. Computerization of HIS data processing and reporting
3. Connecting all health service facilities to the Internet
4. Promoting the use of the available data in decision making
5. Supporting hospital statistics

The Health and Vital Statistics Departmen t established multiple output and impact indicators for these results. The activities and progress observed during this visit indicate that the Health and Vital Statistics Department and the IT Department are working together to meet these objectives.

Several initiatives are underway to improve the quality and timeliness of data collection and reporting, and the use of information technology by the Ministry. These are described in the following section.

3.6 Current Activities

The following major activities are underway to improve the existing HIS:

1. HIS database development by the WHO
2. Development of a personnel database by the IT department
3. Development of some facility-level databases by the IT department
4. Revision of the supervisor checklist for health services

The Ministry has provided a compete set of standard forms, tables, and reports to the WHO. The WHO is reportedly developing HIS database applications based on this information. The Ministry has no report on the status of this project.

The IT department, on its own without executive mandate, developed a personnel database for the Ministry. This database is not yet in use. The IT Department is also

developing standalone database applications for use at the facility level. These include pharmaceutical supply management and patient records.

Recently, prompted by discussions with the TMPP, the Ministry began a project to analyze and revise the existing supervisory checklist system for health care facilities. The TMPP is working closely with the Ministry to improve the usefulness of the checklist and to add sections to monitor the impact of new skills included in the cascade training program.

4 Conclusions and Recommendations

4.1 Coordination with other Donors

The WHO has been a key provider of computing equipment and funding for networking and telecommunications. The WHO has also provided software for managing pharmaceutical supply warehouses, and is reportedly working on HIS database software based on example paper forms and reports provided by the Ministry. Close coordination with the WHO is essential to prevent duplication of effort and to ensure that donor resources are coordinated efficiently in support of HIS strategy.

4.2 Needed Technical Assistance

The Head of the IT Department has requested technical assistance in the following areas:

1. Technical review of vendor proposals to network the central Ministry
2. Technical and cost review of vendor proposals to provide Internet connectivity to remote health offices and facilities
3. Technical training for IT programmers in database architecture, SQL, and web application development
4. Help designing a new public website
5. Help designing an intranet website to serve all divisions within the Ministry
6. Help designing and developing database-driven web sites

The Director of the Health and Vital Statistics Department has requested technical assistance in the following areas:

7. Effective methods for improving data quality

In addition to these specific requests, the Ministry needs technical assistance in the following areas:

8. Coordinating and developing HIS strategy through a process that includes all key stakeholders in the Ministry and donors who funded activities to enhance the HIS.
9. Developing and documenting minimum standard datasets for the various types of health facilities
10. Developing and documenting a standard HIS data dictionary incorporating national and international coding systems.

11. Developing appropriate technical solutions for automated data processing at the facility level, and timely transfer of data to governorate and central levels.

12. Information Technology strategy, management, and operations.

13. Networking and telecommunications.

14. Information systems security.

15. Software development best practices.

16. End-user support systems.

The following section discusses how these requests are related to TMP P project results and prioritizes technical assistance recommendations on this basis.

4.3 Relationship to TMPP Project Results

Technical assistance in IT and HIS is aimed at achieving the following TMPP project results:

Strategic Objective 1 Iraq Ministry of Health (MoH) supported in collaborative design and implementation of a professional training and management program for primary health care with certification centers operating throughout Iraq.

IR 1.4 Monitoring information systems supporting quality primary care centers established and managed by MoH personnel

Other TMPP project intermediate results could be interpreted broadly to require an effective HIS, but IR 1.4 is specific and is the center of our focus.

The following three information systems are directly related to achieving IR 1.4:

1. A training management information system to provide information concerning which PHC center personnel have completed which training modules and where those persons are currently working.

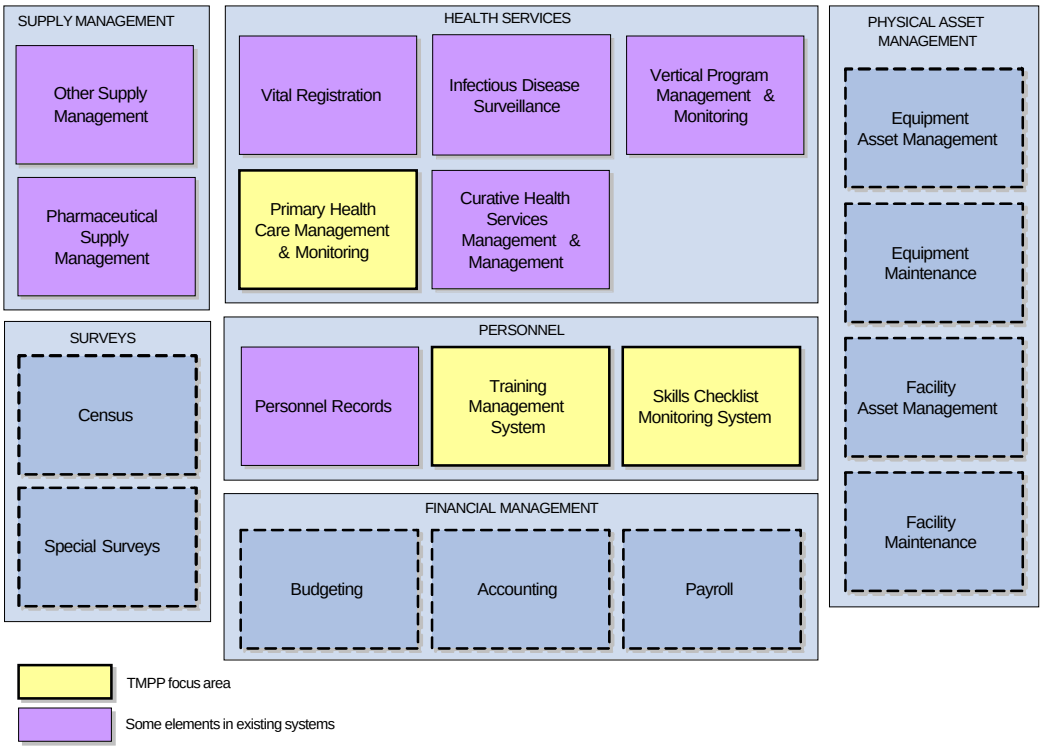
2. A skills monitoring information system to continually monitor whether personnel are using the skills they learned during training and to provide information needed to adapt and target training to achieve the target quality of care results.

3. A quality of care monitoring information system to continually monitor the quality of care in PHC centers and to provide the information needed to adapt training and personnel assignment to achieve the target quality of care results.

All three of these systems are closely related. For example, the quality of care monitoring system may identify weaknesses in a specific area in several PHC centers within a governorate. Information from the skills monitoring system might be used to determine which medical personnel may require further training. The training management system could be consulted to determine what training each person had received, and to schedule follow-up training. The quality monitoring system could also be used to identify exemplary PHC centers in governorate that could be used to provide remedial in-service training.

Exhibit 2 shows how these three systems fit into the overall HIS component framework. Existing systems include some elements contained in some component systems. These systems, however, are at very early stage of development, and the Author has not been able to examine any of them in detail.

Exhibit 2 Block Diagram Showing Major HIS Component Systems



4.4 Prioritizing TMPP Technical Assistance in Support of Project Results

The objectives of the TMPP project are to provide technical assistance and material support to the Ministry so that these systems are designed, implemented, institutionalized, and sustained. Thus these systems should be viewed by the Ministry as MOH systems that are part of the larger HIS. In practice, combining data from these and other HIS component systems will require the use of common codes and common data definitions. The Ministry will need to reconstitute a broader HIS working group and will need guidance in developing coding standards, a data dictionary, and minimum data sets for the HIS.

As described in this report, HIS and quality of care supervisory (monitoring) data are entered into desktop computers in governorate DOH offices, and then submitted to the central Ministry on diskette or via e-mail. This strategy reflects the limited availability and reliability of Internet access, as well as the technical capacity of the IT department. As Internet access improves it should become practical to transmit data electronically and, eventually, to migrate to web-enabled databases for some HIS component systems. The MOH could make effective use of technical assistance in these areas.

The data quality problems reported by the Health and Vital Statistics Department are also likely to affect component systems introduced through the TMPP project, if they are not addressed. The MOH could make effective use of technical assistance to improve the quality to data provided by governorates, districts, and facilities.

The impetus for the quality of care monitoring system exists already in the MOH. While the system needs improvement, it is in operation and serves information demand within the Ministry. The impetus for the training management information system and the training skills management system are coming from the TMPP. It is essential to develop strong stakeholders for these systems within the MOH if they are to be sustained. The TMPP needs to develop this demand through the HRDC and the Quality Assurance Section of the Public Health and Primary Health Care Directorate.

The TMPP also needs to help the IT Department to develop these database applications by providing practical examples and on-the-job technical assistance.

Finally, the ability of the MOH to provide users access to new information system components, including the three systems listed in the previous section, depends on the success of networking infrastructure projects initiated by the IT Department. The Department has very little technical experience and no operational experience with this technology. Effective technical assistance in this area is important to facilitating timely data collection and user access to the resulting information.

Thus technical assistance provided by the TMPP should focus on the following in priority order from most important (1) to least important (7):

1. Develop broad consensus on HIS strategy and data standards, including documented data coding, data dictionary, and minimum data set standards.

2. Develop stakeholders and ownership by the Ministry of the training management information system and the skills monitoring system.

3. Help the IT Department to develop training management and skills monitoring information systems for the HRDC and the Quality Assurance Section of the Public Health and Primary Health Care Directorate.

4. Help the IT Department to develop a quality of care monitoring information systems for the Quality Assurance Section of the Public Health and Primary Health Care Directorate.

5. Introduce new and effective methods for improving health data quality.

6. Strengthen the capacity of the IT Department to support networking, telecommunication, and server infrastructure.

7. Introduce data transmission technologies that take advantage of improving network and telecommunications infrastructure.

Annex A: References

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PNADB678 Guide for answering the Building Inventory Database . USAID Iraq Health Systems Strengthening Project, USAID Contract Number RAN-C-00-03-00010-00, 29 November 2003, 9 pages, English.

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PDACA979 Kimadia system overview, Phase 2 . USAID Iraq Health Systems Strengthening Project, USAID Contract Number RAN-C-00-03-00010-00, 16 August 2003, 8 pages, English.

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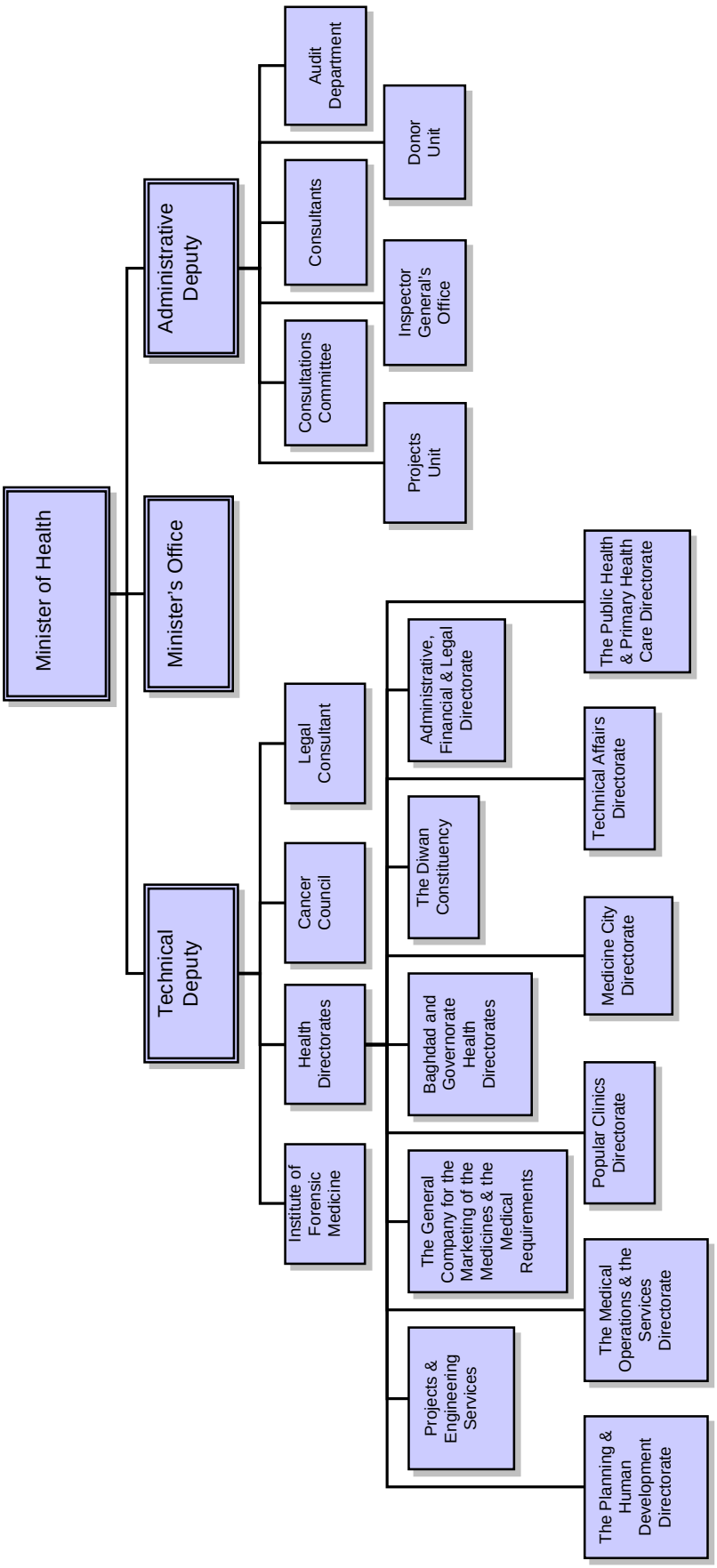
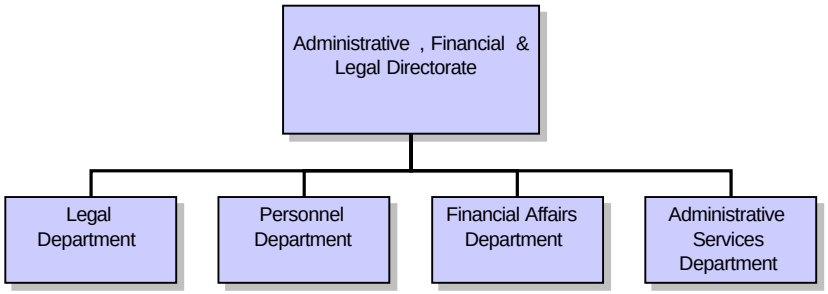
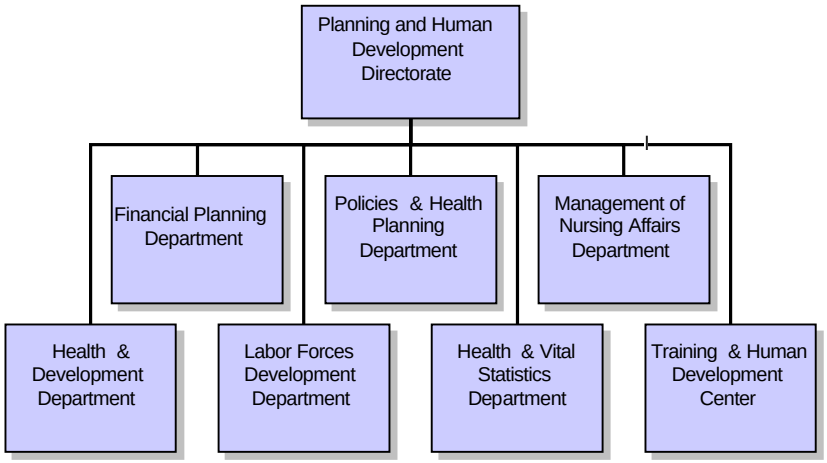
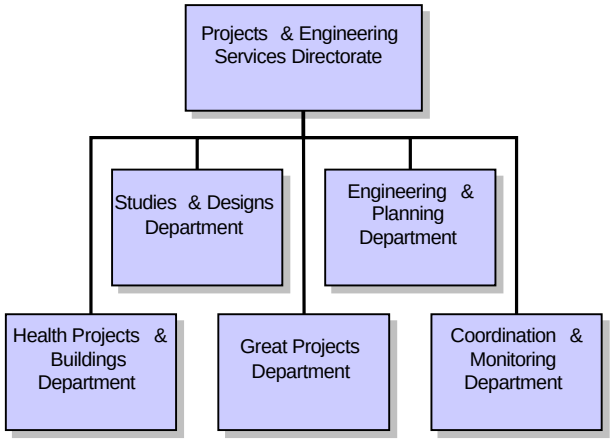
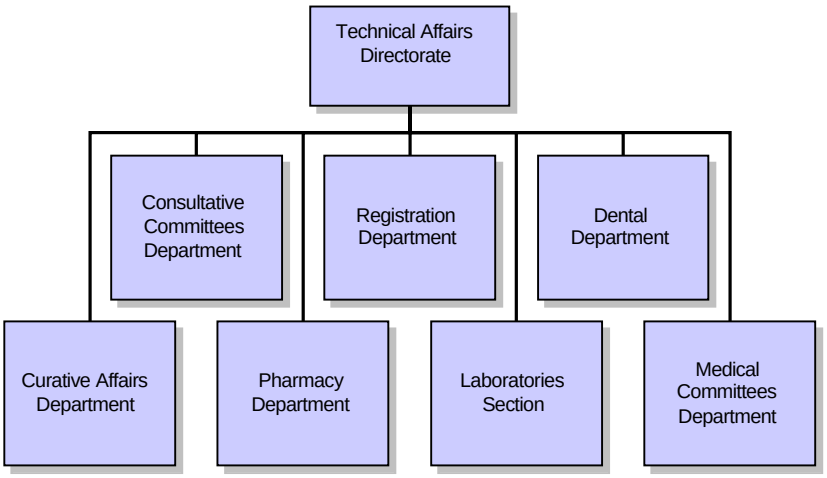
Annex B: Organizational Diagrams for the Ministry of Health

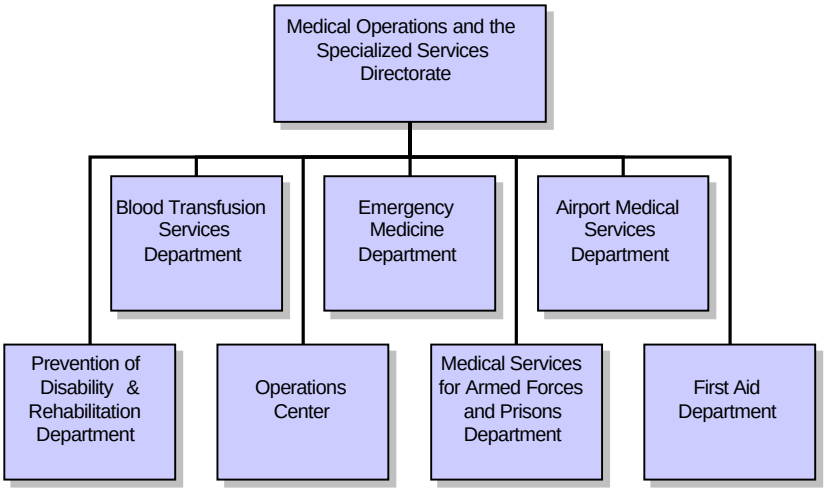

Minister of Health
Minister's Office
Administrative Deputy
Audit Department
Donor Unit
Consultants
Inspector General's Office
Consultations Committee
Projects Unit
Technical Deputy
Legal Consultant
Cancer Council
Health Directorates
Institute of Forensic Medicine
Administrative, Financial & Legal Directorate
The Public Health & Primary Health Care Directorate
Technical Affairs Directorate
The Diwan Constituency
Medicine City Directorate
Baghdad and Governorate Health Directorates
Popular Clinics Directorate
The General Company for the Marketing of the Medicines & the Medical Requirements
The Medical Operations & the Services Directorate
Projects & Engineering Services
The Planning & Human Development Directorate

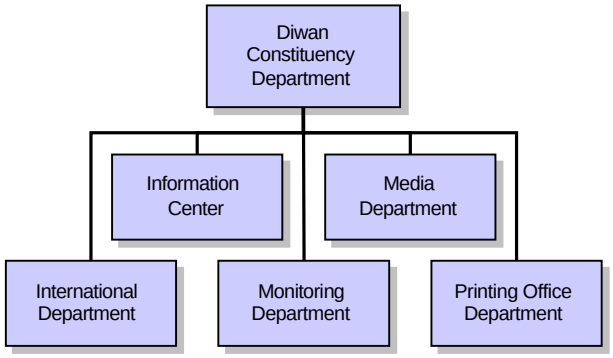

Administrative , Financial & Legal Directorate
Legal Department
Personnel Department
Financial Affairs Department
Administrative Services Department

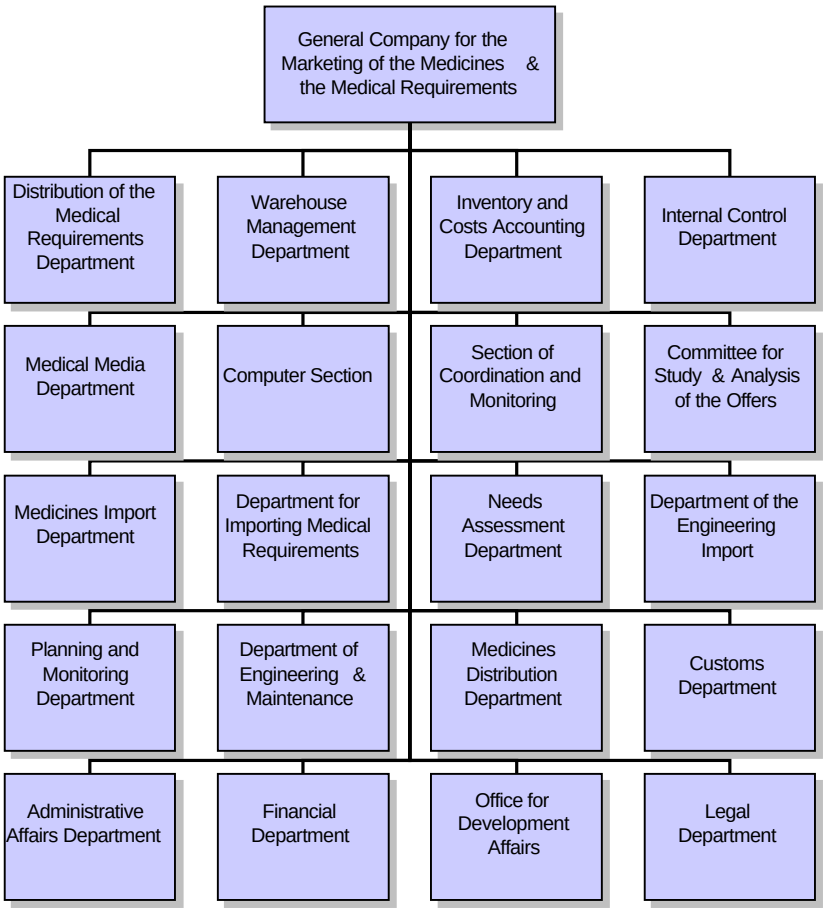

Planning and Human Development Directorate
Financial Planning Department
Policies & Health Planning Department
Management of Nursing Affairs Department
Health & Development Department
Labor Forces Development Department
Health & Vital Statistics Department
Training & Human Development Center


Projects & Engineering Services Directorate
Studies & Designs Department
Engineering & Planning Department
Health Projects & Buildings Department
Great Projects Department
Coordination & Monitoring Department


Technical Affairs Directorate
Consultative Committees Department
Registration Department
Dental Department
Curative Affairs Department
Pharmacy Department
Laboratories Section
Medical Committees Department


Medical Operations and the Specialized Services Directorate
Blood Transfusion Services Department
Emergency Medicine Department
Airport Medical Services Department
Prevention of Disability & Rehabilitation Department
Operations Center
Medical Services for Armed Forces and Prisons Department
First Aid Department


Diwan Constituency Department
Information Center
Media Department
International Department
Monitoring Department
Printing Office Department


General Company for the Marketing of the Medicines & the Medical Requirements
Distribution of the Medical Requirements Department
Warehouse Management Department
Inventory and Costs Accounting Department
Internal Control Department
Medical Media Department
Computer Section
Section of Coordination and Monitoring
Committee for Study & Analysis of the Offers
Medicines Import Department
Department for Importing Medical Requirements
Needs Assessment Department
Department of the Engineering Import
Planning and Monitoring Department
Department of Engineering & Maintenance
Medicines Distribution Department
Customs Department
Administrative Affairs Department
Financial Department
Office for Development Affairs
Legal Department

Annex C: Information Technology Department Assessment Form

Assessment Form
Information Technology Department

Date: 27 September 2005
Name of Department: Information Technology Department
Name of Assessor: Gordon M. Cressman
Source of Information: Dr. Ali Al-Saady, Head, Information Technology Department

Criteria	Yes	No	Explanation
1 Position in Organization			
1.1 Reports to chief executive		X	The IT Department is part of the Ministerial Executive (Diwan Constituency) Directorate, which is grouped under Health Directorates, which reports to the Technical Deputy, that reports to the Minister.
1.2 Responsible for IT infrastructure	X		
1.3 Responsible for information systems	X		Most departments use Word and Excel. A very few may develop their own Visual FoxPro database applications.
1.4 Responsible for user support	X		Some departments have their own IT staf f members who provide first level support. The IT Department
1.5 Responsible for entire organization	X		The IT Department is responsible by ministerial decree for all IT infrastructure in the MOH. The situation is less clear concerning applications, but the Department appears to be taking a strong lead in gathering requirements, assessing alternate technologies and setting development priorities.
1.6 Responsible for regional offices	NA		
1.7 Responsible for governorate/provincial offices	X		The IT Department is responsible for overseeing IT infrastructure and applications at the governorate level. There are currently no IT divisions in the governorate level, but the IT Department plans to create them.
1.8 Responsible for district offices	NA		
2 Staffing			
2.1 Network/telecom engineers	X		There is at least 1 network/telecom engineer.
2.2 Has designated hardware maintenance staff	X		There are 8 to 10 designated hardware maintenance engineers.
2.3 Designated information systems architect(s)	X		The Department has at least 1 information systems architect. The Head of the Department often serves as an information systems architect.
2.4 Designated software development staff	X		There are 12 designated programmers.
2.5 Designated user support staff		X	Hardware maintenance engineers and programmers provide support to users as needed.
3 Technology Strategy and Standards			
3.1 Has prioritized plan for applications development?		X	There is no formal, written plan, but the Head of the Department has a clear understa nding of what applications are needed and which applications would have the most positive impact on MOH operations in terms of reducing costs/waste

Criteria	Yes	No	Explanation
			and improving the quality of care.
3.2 Has selected and documented technical standards?		X	The Department does not have a complete, documented set of core technical standards. They have set standards for PC hardware and have established the Department as the standards reference for IT.
3.3 Written technology management plan		X	There does not appear to be any written technology management plan, but the Head of the Department has a clear vision for infrastructure and application development and is able to articulate those clearly. The Department has also developed and managed Requests for Quotations for network infrastructure for MOH central offices and Internet connectivity for governorate health directorates.
3.4 Written hardware replacement plan		X	There does not appear to be any written hardware replacement plan. The Head of the Department has estimated the useful life of the PCs purchased by and donated to the MOH and does not anticipate problems in replacing them as needed every 2.5 to 3 years.
3.5 Software upgrade plan		X	Most of the software installed are illegal copies. This
4 Policies and Procedures			
4.1 Written acceptable use policy		X	They have been informing Internet users that the Internet connection is for e-mail and MOH-related work only. They have posted signs stating this. They have not yet institutionalized a complete acceptable use policy.
4.2 Written data security policy		X	
4.3 Written data backup procedures		X	
4.4 Written disaster recovery plan		X	
4.5 Organization chart	X		
4.6 Written position descriptions		X	It is not clear whether they have written descriptions. Each member of the department has a clearly designated role, but many staff members serve several functions. Even the Head of the Department is involved in requirements gathering and hands-on hardware installation.
4.6 Written capacity development plan for technical staff		X	They are doing the best they can to learn on the job and from online resources. The department does not have a written plan for staff technical training.
5 Web Presence			
5.1 Internet web site	X		The MOH website exists, but is not well maintained.
5.2 Hosts and maintains own website		X	The site was developed by and is hosted and maintained by the Baghdad Chamber of Commerce. The IT Department cannot maintain the content directly, and finds it difficult to bet the Chamber to make updates.
5.3 Intranet website		X	The IT Department would like very much to have an intranet website. The Head of the IT Department would like to see examples of how a large and complex organization like the MOH can be served by a single intranet website.
6 User Support			
6. 1 User helpdesk	X		Some other departments have their own IT staff who provide first level support. The IT Department is recognized as the primary souce in the MOH for user support (hardware or software problems), and provides first or second level support

Criteria	Yes	No	Explanation
			to all departments. The IT Department is also responsible for supporting IT infrastructure and applications at the governorate level.
6. 2Helpdesk case management system		X	The IT Department is not using a formal helpdesk case management system.
7 Software Development			
7.1 Spreadsheet applications		X	The IT Department and other departments develop spreadsheets using Excel. It is not clear whether they use macros or Visual Basic for Applications for more complex spreadsheet applications.
7.2 Stand-alone database applications	X		All database applications developed by the IT Department to date have been stand-alone applications. These have been developed using Microsoft Visual FoxPro
7.3 Multi-user database applications		X	
7.4 Database-driven web applications		X	
7.5 Follows structured software development life-cycle?		X	The IT Department gathers requirements and works closely with users. The software development process appears to be somewhat informal.
7.6 Uses managed software development teams?	X		Some software development is done in teams of 3 to 4 programmers managed by a senior software developer who reports to the Head of the Department.
7.7 Uses source code control tools?		X	They do not use automated tools, but do control source code through management procedures. The Head of the Department is aware of source code control tools, but the department has not used them.
7.8 Uses bug tracking tools?		X	They must use some internal lists (Excel, Word) to keep track of bugs discovered during testing, but the y do not appear to use any bug tracking tools.
8 Data Standards			
8. 1 Have standard codebook?		X	The MOH uses ICD9 coding for diseases and are preparing to move to ICD10. The IT Department is using the National Codes for Pharmaceuticals. They have not est ablished standard coding for other elements (facility type, facility, position type, position, etc.)
8.2 Have standard data dictionary?		X	They do not have a standard data dictionary.

Annex D: Information Technology Standards Checklist

Assessment Form
Information Technology Standards

Date: 27 September 2005
Name of Department: Information Technology Department
Name of Assessor: Gordon M. Cressman
Source of Information: Dr. Ali Al-Saady, Head, Information Technology Department

Component	Standard	Comments
1 Hardware		
1.1 Client	Desktop PC, Intel processor, 256MB memory minimum	Standards have been set for general platform , processor, processor speed, and memory. Desktop PCs have been provided from various donors resulting in a variety of makes and models. The variety of hardware contributions from donors makes it impossible to enforce a standard make and model.
1.2 Server	No formal standards.	No formal standards have been set and documented. The IT department has 11 new servers ready for deployment as part of a project to network all departments of the central ministry. No formal standard has been developed, but these Windows servers will in effect set the standard. The TMPP does not have detailed information on the server hardware or operating system.
1.3 Network and Telecommunications	No formal standards.	No formal standards have been set and documented. The IT department has initiated a project to network all major departments of the central Ministry. The work will be carried out by a contractor. The equipment provided by the contractor will in effect set a standard.
1.4 Network Security	No formal standard.	No standards have been set with respect to Internet firewall, intrusion detection, or other network security components. Neither of the two existing VSAT connections at the central Ministry is protected by an Internet firewall. Awareness and sensitivity to security issues are weak.
1.5 Peripherals	No formal standard.	No formal standards have been set for printers, scanners, and other peripherals.
2 Software		
2.1 Client Operating System	Windows XP Professional	
2.2. Server Operating System	No formal standard.	Unknown, but presumed to be Windows Server 2003
2.3 Server Security	No formal standard.	No standards have yet been set regarding server patch management, anti-virus, or other server security software.
2.4 Database Server	No formal standard.	The Ministry does not currently operate any database servers.
2.5 Web Server	No formal standard.	The Ministry does not currently operate any Web servers.
2.6 Application Development Tools	Microsoft Visual FoxPro Microsoft Access XP Microsoft Visual Basic	All development to date has been for stand-alone single-user database applications. Given the current absence of networking and Internet connectivity this is appropriate. This situation should change rapidly over the next 12 -18 months. The IT department will need to develop the capacity to use increased connectivity effectively.

Component	Standard	Comments
2.7 Client Security	Symantec Norton Antivirus	All desktop computers are equipped with Symantec Norton Antivirus. As increasing numbers of computers have Internet access via the Ministry network, it will be increasingly important to have effective tools , systems, policies, and procedures for applying critical security patches, updating anti-virus software, and protecting against spy ware.
2.8 Client Applications	Office XP Professional	Training in the new WHO-equipped computer training room in the Human Resources Development Center includes introductory courses in Windows, Word, Excel, and Access.